EXPLORING THE RELATIONSHIP BETWEEN FIRM'S LEVEL CULTURAL INTELLIGENCE AND SUPPLY CHAIN ISSUES

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ABSTRACT

This paper investigates the relationship between two dimensions of firm's level cultural intelligence (CQ) namely competitive CQ and structural CQ with five major supply chain issues, which include inventory issues, customer service issues, organisation issues, information/system issues and product flow issues. Data were collected among 60 manufacturers in three northern states of Malaysia via survey questionnaires. Results indicate significant and negative relationships between competitive CQ and customer service issues, inventory issues, information/system issues and product flow issues. The findings also indicate that structural CQ has a significant but negative relationship with customer service issues and organisational issues only. These findings indicate that firm's level CQ is also important towards firm's operations and the relationship between firm's level cultural intelligence and supply chain issues which did not receive much attention before were also identified. This study provides empirical evidence on the impact of higher cultural intelligence in minimising the supply chain issues. Managers should give more effort in enhancing cultural intelligence within their firms in order to maximise their supply chain performance. This study also fills the gap in the literature which previously concentrates more on individual cultural intelligence and its effect on firm's performance. The directions for future research are then discussed.

Keywords: *cultural intelligence (CQ), supply chain issues, firm level CQ, manufacturing*

INTRODUCTION

Inherent to globalization, manufacturing firms these days are faced with huge challenges when dealing with supply chain partners that have different cultures, practices and other local variations. Therefore, both the managers and the firm itself are expected to embrace the concept of cultural intelligence (CQ). Originating from Sternberg and Detterman (1986) framework of the multiple foci of intelligence, cultural intelligence is defined as an individual's capability to function and manage effectively in culturally diverse settings. CQ mirrors the contemporary views of intelligence and the CQ concept which comprises of meta-cognitive, cognitive, motivational and behavioural dimensions dictates that individuals be equipped with special social-cognitive skills of social learning and communication to accurately predict cultural-related behaviours. Thus, Ang and Inkpen (2008) went

further to propose that in order for firms to successfully enter a new foreign market, the CQ concept should be present at both the individual and firm's levels. Though CQ at individual level has gained momentum through leadership, training and human resource related studies; CQ at firm-level is still a novel idea. Most researchers concentrate their study on individual level CQ and very few focused on firm's level CQ. Ang and Inkpen (2008) argued for the importance of the firm-level cultural intelligence in the context of international business ventures. They expect that only culturally intelligent firms would be able to leverage effectively from the international business ventures.

Firms that are involved in international business also face difficulties because global operations introduce greater complexities and uncertainty to key manufacturing and supply chain processes as geographic and cultural distances are crossed. The complexity of international business environment that include different business customs, inadequate logistics infrastructure, restrictive regulatory frameworks and different levels of supply chain services give rise to issues that tend to offset efforts to establish an efficient supply chain and often lead to higher total supply chain costs. Although studies on supply chain issues have been done sporadically, none have taken into account the influence of cultural intelligence on the level of severity of supply chain issues. At the same time, researchers prefer to conduct a study on individual level CQ rather than firm's level CQ. Based on this gap in the literature, this study is conducted with the objective is to explore the relationship between firm's level cultural intelligence and the severity or level of the supply chain issues faced by manufacturing firms.

SUPPLY CHAIN ISSUES

A supply chain is a network of retailers, distributors, transporters, storage facilities, and suppliers that participate in the production, delivery, and sale of a product to the consumer. The supply chain is typically made up of multiple companies who coordinate activities to set themselves apart from the competition. It involves the coordination of an organization's internal planning, manufacturing and procurement effort with the company's external partner (McLaren, Head & Yuan, 2002). Proper management of supply chain activities is important as it may serve as a source of competitive advantage (Ireland & Webb 2007). Supply chain management (SCM), therefore is a methodology to improve business efficiency in finding raw materials and components for a business product or service and delivering it to the customer. However, there could be some critical supply chain issues exist and they tend to offset manufacturing firm's supply chain activities and its benefit. Therefore, this study define supply chain issues as the problems associated with any of the supply chain activities and it can become the barriers to effective supply chain management.

There are several types of issues that might be faced by manufacturing firms in today's global supply chain scenario. These issues could come from a number of sources such as governmental, economic, trade, political, regulations and legal requirements, corporate politics, complicated customs procedures, social and cultural and geographic (Carter, Pearson & Peng, 1997). There is no evidence of previous study that looks at the relationship between cultural intelligence and supply chain issues. Some studies on supply chain issues however posit a negative relationship between supply chain issues and the dependent variables of the study such as entrepreneurial orientation (Zhang, Ma & Wang, 2012) or manager's risk taking behaviour and intention to venture abroad (Carter, Pearson & Peng, 1997). Foggin, Mentzer and Monroe (2004) describe major supply chain issues as a five major 'pain points' in the supply chain and it includes inventory, customer service, organization, systems and product flow issues. Table 1 highlights some of the problems associated with each supply categories of chain issues.

Table 1 Example of supply chain issues

Issues	Associated problems
Inventory issues	Too little or too much inventory due to long transit times caused by offshore sourcing or due to ocean transportation Too much inventory due to forecasting difficulties or inaccuracies and wrong mix of inventories.
Customer service issues	Poor pipeline visibility Blame setting Complicated ordering procedures Late delivery, incomplete shipments or poor shipment integrity Non-delivery due to inventory shortages
Organisation issues	Poor supply chain coordination No clear line of authority Poor inter or intra communication Lack of standard business processes Unrealistic expectation of supply chain partners
System/information issues	Poor information/data flows Unlinked system Lack of system support Lack of real time POS data System do not match business processes
Product flow issues	Use wrong mode of transportation used Lack of provider availability and capability lack of resources to manage product flow effectively lack of expertise in international shipping customs compliance issues Lack of shipment tracking,

FIRM'S LEVEL CULTURAL INTELLIGENCE

Feiler (1999) highlights that among the reason for firm's failure in international business is due to some serious errors and misjudgement concerning the social, cultural, and political environment of the international countries. Obviously, conducting CI on a global basis is much more complicated than doing that domestically since firms need to be culturally intelligence as one of the ingredients for success. Cultural intelligence as highlighted earlier consists of individual CQ and firm's level CQ. This study focus on firm's level CQ which according to Ang and Inkpen (2008) includes competitive CQ and structural CQ.

According to Ang and Inkpen (2008), managerial capabilities embodied in CQ will be insufficient to create sustainable offshoring advantage. Offshoring is defined as the movement of a business process done at a company in one country to the same or another company in another, different country. Almost always work is moved because of a lower cost of operations in the new location. More recently, offshoring drivers also include access to qualified personnel abroad, in particular in technical professions, and increasing speed to market (Zuckerman, 2008). In the competitive dimension of firm-level cultural intelligence, Ang and Inkpen highlight the competitive risks associated with offshoring projects. Firms with good competitive CQ are expected to have the capability to effectively identify, calibrate, and manage these risks. They added that intelligent firms cannot simply exist just because

firms have culturally intelligent managers. In addition, the firm itself must possess competitive resources that are embodied in the processes and routines that exist in the firm in order to effectively compete in the global business environment. Based on the above discussions on competitive CQ and the supply chain issues before, competitive CQ is expected to positively improve firm's performance and on the other hand, supply issues tend to offset a firms effort to establish an efficient supply chains system, and often lead to higher total supply chains costs and decrease flexibility that will adversely affect the firm's competitive position (Carter, Pearson & Peng, 1997). Since there is no evidence of previous study that looks at the relationship between competitive CQ and supply chain issues, a proposition is developed for this study which assumes that firm's with higher competitive CQ will be able to better manage its supply chain activities, thus reducing the numbers of supply chain issues. Thus, these hypotheses were developed to study the relationship between competitive CQ and the five major supply chain issues:

H1: Competitive CQ has a negative influence on inventory issues.
H2: Competitive CQ has a negative influence on customer service issues.
H3: Competitive CQ has a negative influence on organisation issues.
H4: Competitive CQ has a negative influence on system/information issues.
H5: Competitive CQ has a negative influence on product flow issues.

The structural dimension of firm's cultural intelligence stress on the importance of developing a culturally intelligent structural norm within the firm. The structural norms govern the inter-organizational interface and take into consideration potential cultural faultiness that could occur at the interface (Ang & Inkpen, 2008). Structural CQ refers to the way a firm organises and develops routines for hierarchical or reporting relationships (Miller & Friesen, 1983). Structure can be formal and informal. In terms of formal structure, some firms have horizontal hierarchical structures that enable quick communication and response while others prefer vertical hierarchical structures that emphasize detailed deliberation and control. Some firms are more decentralised and some are centralised in their organisational and control structure. The structures reflect how firm actions and strategies are formulated and implemented. They are also a complicated patterns of social action developed over a certain period of time (Nelson and Winter, 1982). In terms of informal structure, routines and actions are often shaped by social networks and cliques that do not exist officially in a firm (Inkpen & Tsang, 2005). Similar with competitive CQ, this study proposed that firm's with higher structural CQ will also be able to better manage its supply chain activities, thus reducing the numbers of supply chain issues. Thus, these hypotheses were developed to study the relationship between competitive CQ and the five major supply chain issues:

H6: Structural CQ has a negative influence on inventory issues.
H7: Structural CQ has a negative influence on customer service issues.
H8: Structural CQ has a negative influence on organisation issues.
H9: Structural CQ has a negative influence on system/information issues.
H10: Structural CQ has a negative influence on product flow issues.

METHODOLOGY

A quantitative research approach was adopted for this study where primary data were collected using survey questionnaires. Population of the study is all manufacturing companies in three northern states of Malaysia, namely Penang, Kedah and Perlis. They are from various industries such as electrical and electronics, automotive, chemicals and petroleum, food and beverage, and also machinery and fabricated metal industry. The sampling frame used for this study is the Federation of Malaysian Manufacturers (FMM) Directory for the year 2012. Manual count of the directory shows that there are about 756 manufacturers located in those three states and based on the sample size table developed by Cavana, Delahaye and Sekaran (2001), the number of sample needed for this study is about 250. A simple random sampling method was adopted in selecting the respondent.

Survey questionnaire was developed based on measures used in previous related studies to gain information on the cultural intelligence and supply chain issues. All the measurement items for cultural intelligence were adopted from a study by Ang and Inkpen (2008), while the items for supply chain issues were taken from previous study by Foggin, Mentzer and Monroe (2004). Several items have been adopted with some modifications to suit the context of this study. The survey has 3 different sections where the first sections looks at the company's demographic information while second section measures the competitive CQ and structural CQ. Third section consists of questions for the supply chain issues. Both the competitive and structural CQ were measured using five point Likert scale ranging from 1 (Very low) to 5 (Very High). The supply chain issues were also measured using a five point Likert scale where 1 indicates no issues at all and 5 indicates worst level of supply chain issues faced by the company. The survey questionnaire was pilot tested among 30 conveniently selected manufacturers and the reliability of the measures was assessed through the Cronbach's Alpha coefficients of each variables. Table 2 shows that all variables of the study have a Cronbach's Alpha value of more than 0.6, which is the cut-off value or the acceptable reliability level. 300 survey questionnaires were distributed either via self-administered, regular mail or through email. However, only 64 surveys were completed and returned which makes the return rate of 21 %. Upon initial data screening, only 60 of them are usable. 4 surveys are rejected as they contain excessive missing values.

Table 2 Cronbach's Alpha coefficient for each variable

Variables	Cronbach's Alpha
Competitive cultural intelligence	0.928
Structural cultural intelligence	0.929
Inventory issues	0.784
Customer service issues	0.924
Organisation issues	0.929
System/Information issues	0.954
Product flow issues	0.946

FINDINGS

Appendix 1 shows the demographic background of the company. Majority of the company involved in this study has foreign ownership. Only 7 companies (11.7%) are locally owned. In terms of years of operation, half of the companies (30 or 50%) have been in business for more than 21 years while the other half are less than 21 years. 10 companies (16.7%) are relatively new with less than 5 years of operations. For the number of employees, 70 % of the respondents or 42 companies employ more than 500 workers and only 3 companies have less than 100 employees. Majority of the respondent (39 companies, 65%) earn more than RM 40 million in income annually while the others earn in between 1 to 40 million annually. Table 3 shows the descriptive statistics of each variable of the study and the correlations between both the structural and competitive CQ and each supply chain issues.

The findings indicate that Competitive CQ has a significant but negative correlations with inventory issues ($r = -0.282$, $p < 0.05$), customer service issues ($r = -0.435$, $p < 0.01$), system issues ($r = -0.292$, $p < 0.05$) and product flow issues ($r = -0.289$, $p < 0.05$). Structural CQ meanwhile has a significant negative correlations with customer service issues ($r = -0.333$, $p < 0.01$) and organisation issues only ($r = -0.287$, $p < 0.05$). In terms of strength, competitive CQ has a strong negative relationship with customer service issues while structural CQ has a moderate negative relationship with customer service issues. All the other significant relationships as the abovementioned have weak negative correlations.

Table 3 Means, standard deviation and correlations

	Mean	S.D	Competitive CQ	Structural CQ
Competitive CQ	3.6981	.61	-	-
Structural CQ	3.6450	.67	-	-
Inventory Issues	2.3667	.66	-.282*	-.181
Customer Service Issues	2.3292	.72	-.435**	-.333**
Organisation Issues	2.2576	.74	-.240	-.287*
System/Information Issues	2.3088	.69	-.292*	-.227
Product Flow Issues	2.0772	.69	-.289*	-.180

**. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed)

DISCUSSIONS

Table 4 summarise the results of the hypothesis testing based on the findings discussed before.

Table 4 Summary of hypothesis testing results

Hypothesis	Accepted	Strength
H1: Competitive CQ has a negative influence on inventory issues.	Yes	Weak
H2: Competitive CQ has a negative influence on customer service issues.	Yes	Strong
H3: Competitive CQ has a negative influence on organisation issues.	No	
H4: Competitive CQ has a negative influence on system/information issues.	Yes	Weak
H5: Competitive CQ has a negative influence on product flow issues.	Yes	Weak
H6: Structural CQ has a negative influence on inventory issues.	No	
H7: Structural CQ has a negative influence on customer service issues.	Yes	Moderate
H8: Structural CQ has a negative influence on organisation issues.	Yes	Weak
H9: Structural CQ has a negative influence on system/information issues.	No	
H10: Structural CQ has a negative influence on product flow issues.	No	

The objective of this study was to examine the relationships between two elements of company level cultural intelligence (competitive CQ and structural CQ) on five most common supply chain issues faced by manufacturers. Several notable findings are evident from the data analysis results. Literature mostly noted that being cultural intelligence either at individual or at firm level helps improve firm's performance and competitive advantage. Existence of supply chain issues however tend to offset the benefit of effective supply chain activities, thus effecting firm's performance. This study proposed that firms with higher level of firm's level CQ may lower the severity of supply chain issues and the analysis has proven that this proposition is acceptable, as both the competitive and structural CQ show negative relationships with supply chain issues.

This study adopts two dimensions of firm's level CQ, namely competitive CQ and structural CQ as identified by Ang and Inkpen (2008). Competitive CQ has a significant negative relationship with all issues except organization issues. Competitive CQ was also found to have the strongest relationship with customer service issues. It shows that firms with good competitive CQ are expected to have the capability to effectively deal with their customers that may come from diverse cultural background, hence reducing the customer service issues. Culturally intelligence firms should ensure that all their processes and routines are agile and responsive to customers from different business culture in order to effectively compete in the global business environment. At the same time, firms should embodied good competitive CQ as it also helps to minimise the inventory issues, system/information issues and product flow issues, even though the effect is not as strong as on the customer service issues.
Structural CQ meanwhile is significantly related to customer service issues and organization issues, with both have a moderate and weak relationship respectively. It proofs that firm's with a structure that are responsive to the business environment and cultural differences may help reduce the severity of customer service issues and also firm's organisational issues. Among the organisational issues as highlighted by Foggin, Mentzer and Monroe (2004) are poor supply chain coordination, no clear line of authority, poor inter or intra communication etc. Based on the findings, this study shows that all these issues may well be taken care off if firms consider the cultural aspect when developing their organisational culture. The organisation operates within a dynamic environment requires a structure that are sensitive and readily adaptable to change, based on the cultural values of people in different markets.

CONCLUSIONS and directions for future research

This study observes on the relationship between firm's level CQ and supply chain issues was conducted among manufacturers in Northern Malaysia. Two elements of firm's level CQ were tested namely competitive and structural CQ. Results indicate that supply chain issues, which initially will effect firm's performance may be reduced or even avoided if the firm itself posses high level of both the competitive and structural cultural intelligence. The managerial contribution of this study is that it provides empirical evidence on the impact of higher cultural intelligence in minimising the supply chain issues. Managers should give more effort in enhancing cultural intelligence within their firms in order to maximise their supply chain performance. Lowering and eventually eradicating supply chain issues contributes greatly to the smooth running of the companies' operations and this could extend to the efficiency of its supply chain management. This study also fill the gap in the literature which previously concentrates more on individual cultural intelligence and its effect on firm's performance. Findings proof that firm's level CQ are also important towards firm's operations. The relationship between firm's level cultural intelligence and supply chain issues which did not received much attention before were also identified.

There are some limitations to this study. First, the sampling is done on a simple random basis and samples are not fairly homogeneous in terms of their ownership, size and turnover. Furthermore, all the data is self-reported and purely based on the perception of the managers and there may be self-report biases. At the same time, small sample size and the fact that only manufacturers in the northern region of Malaysia were involved in this study make impact the generalisation of these findings towards the whole manufacturing industry and also the country. However, this study may be considered as a starting point in exploring the relationship between firm's level cultural intelligence and supply chain issues. It adopts five supply chain issues as proposed by Foggin, Mentzer and Monroe (2004). Future studies may explore the impact of both the individual and firm's level CQ with other supply chain issues as identified by the other researchers such as transportation, warehousing, third party logistics and so on. Furthermore, comparison between the effect of individual and firm's level CQ on supply chain issues and identifying which CQ has the most impact would be meaningful. Replicating the study across more heterogeneous samples is encouraged as it may improve the generalisability of the findings.

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APPENDIX

Appendix 1 Demographic Statistics

	Frequency	Percent	Valid Percent
Foreign Ownership			
None	7	11.7	11.9
1 - 50%	7	11.7	11.9
52 - 99%	7	11.7	11.9
100%	38	63.3	64.4
Total	59	98.3	100.0
Missing	1	1.7	
Total	60	100.0	
Years of Operations			
< 5 years	10	16.7	16.7
6 - 10 years	7	11.7	11.7
11 - 15 years	4	6.7	6.7
16 - 20 years	9	15.0	15.0
21 - 25 years	5	8.3	8.3
> 25 years	25	41.7	41.7
Total	60	100.0	100.0

	Frequency	Percent	Valid Percent
Number of Employees			
< 100	3	5.0	5.0
101 - 200	1	1.7	1.7
201 - 300	7	11.7	11.7
301 - 400	4	6.7	6.7
401 - 500	3	5.0	5.0
> 500	42	70.0	70.0
Total	60	100.0	100.0
Annual Turnover			
1 - 10 mil	9	15.0	15.8
10.1 - 20 Mil	3	5.0	5.3
20.1 - 30 Mil	4	6.7	7.0
30.1 - 40 Mil	2	3.3	3.5
> 40 mil	39	65.0	68.4
Total	57	95.0	100.0
Missing	3	5.0	
Total	60	100.0	